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PATENTS ORDINANCE
Chapter 514
Laws of the Hong Kong Special Administrative Region

The attached is a true copy of the Short-term Patent Application No. 04101244.8, which was deemed to be withdrawn on 21 January 2005. The accorded filing date is 20 February 2004.

Dated this 22nd day of February 2005.

(YIP CHIU YING RITA)
Intellectual Property Examiner
for Registrar of Patents

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Patents Form P6
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Patents Ordinance
(Chapter 514)

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Date of receipt
Application No. 04101244.8
Accorded filing date 20 FEB 2004

Request for Grant of a Short-Term Patent

Patents Ordinance sections 113, 116, 125
Patents (General) Rules sections 58, 74

(See the notes on the last page of this form)

01	**Your reference**	9874068 YZHAO
02	**Applicant's details** *(see note (4)(a))*	
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	Kind of incorporation Country of incorporation State of incorporation *(if applicable)*	
03	**Title of invention** *(see note (4)(b))* English	Hair Curling Iron with Rotatable Barrel
	Chinese	

04 **Details of International Patent Classification** *(see note (5))*	IPC Code A47J	IPC Edition No. 7 (2013.01)
05 **Use of micro-organisms** *(tick the appropriate box)* (a) Does the invention require the use of a **micro-organism** for its performance?		☐ Yes ☒ No
(b) If you have ticked "Yes", please indicate whether the micro-organism is available to the public at the date of filing of the application; and		☐ Yes ☐ No
whether the micro-organism is described in the application or the specification of the patent in such a manner as to enable the invention to be performed by a person skilled in the art.		☐ Yes ☐ No
(c) If you have ticked "No" in **both** boxes in (b), please give the following details: Name and address of the depositary institution where a culture of the micro-organism is deposited		Name: Address:
Date of deposit *(Day/Month/Year)*		
Accession No. of the deposit *(section 73 and Schedule 1, Patents (General) Rules)*		
06 **Details of international application** If the short-term patent application is based on (a) International Application No.		
(b) International Filing Date *(Day/Month/Year)*		
(c) International Publication No.		
(d) International Publication Date *(Day/Month/Year)*		
(e) Date of entry into the national phase in the People's Republic of China or Date of issuance of the National Application Notification by the State Intellectual Property Office *(tick the appropriate box and enter the date in the space provided)*		☐ _____ *(Day/Month/Year)* ☐ _____ *(Day/Month/Year)*

(f) Application No. of the Chinese patent application (if known) *(section 125, Patents Ordinance and section 78, Patents (General) Rules)*	

07 Details of earlier application If the application is divided or derived from an earlier Hong Kong application	
(a) Section under which an earlier application is claimed *(see note (6))* *(tick the appropriate box)*	Patents Ordinance ☐ section 116 ☐ section 55
(b) Earlier Application No.	
(c) Earlier Application Filing Date *(Day/Month/Year)*	

08 Details of the priority application
If a statement of claim of priority under section 111, Patents Ordinance is made
(sections 58(5)(c), 69, Patents (General) Rules)

Statement

Country	Priority Application No.	Priority Application Filing Date

09 Details of inventor
(see note (4)(a))
(see note (7))

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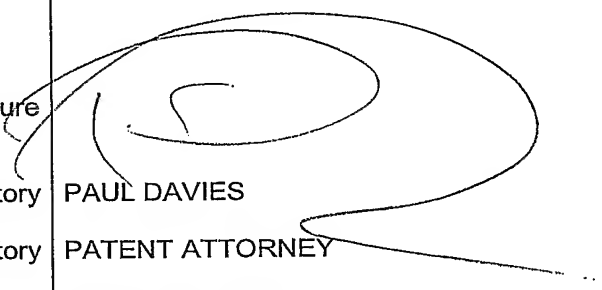
10 Non-prejudicial disclosure
If the applicant is making a claim regarding non-prejudicial disclosure under section 109, Patents Ordinance, please provide a statement giving details relating to such disclosure.
(see note (8))

Statement

Name and place of the exhibition or meeting	Opening date of the exhibition or meeting	Date of first disclosure

11	If a **request for deferral of grant** under section 119, Patents Ordinance is required, please tick the box and enter the period of such deferral. *(the period of deferral should not exceed 12 months)* *(if the box is not ticked, it will be taken that deferral of grant is not requested)*	nil (5) ☐ Request for deferral of grant up to 20.2.05 *(Day/Month/Year)*
12	**Enter the no. of sheets for any of the following documents you are filing with this form**	No. of sheets
	(a) Continuation sheet for the request	
	(b) Description	6
	(c) Claim(s)	3
	(d) Drawing(s)	3
	(e) Abstract *(in both English and Chinese)*	1
	(f) Priority document(s)	
	(g) Translation of the priority document(s)	
	(h) Search Report	
	(i) Translation of the Search Report	
	(j) In the case of an international application, copy of :	
	(i) the international application as published by the International Bureau	
	(ii) the international search report	
	(iii) translation as published by the State Intellectual Property Office	
	(iv) publication of information by the State Intellectual Property Office concerning the international application	
	(k) Statement of inventorship on Patents Form P7 in accordance with section 113(2)(c), Patents Ordinance and section 65, Patents (General) Rules *(see note (7))*	
	(l) Others *(please specify)*	

13 **Name of agent** *(if you have one)* Address for service in Hong Kong Telephone Fax Agent's code *(if known)*	**Deacons** **Alexandra House** **3rd - 7th, 18th and 29th Floors** **Central** **Hong Kong** 2825 9221 2810 0431
14 I/We request the Registrar to grant a short-term patent. Signature Name of signatory Official capacity of signatory Date *(Day/Month/Year)*	 PAUL DAVIES PATENT ATTORNEY 20 February 2004

HAIR CURLING IRON WITH ROTATABLE BARREL

BACKGROUND

1. Field of the Invention

The present invention relates generally to hair styling, and more particularly to a hair curling iron with rotatable barrels for curling or straightening hair.

2. Background of the Invention

Curling irons have been widely used to either curl or straighten hair. Some modern designs use at least one rotatable barrel inside a holder of the curling iron, and the barrel is heated when in use for curling or straightening the hair. Conventionally, a metal shaft about which the barrel rotates functions as a resistor heater for heating the barrel through, for example, thermal conduction. However, the thermal conduction may cause the loss of a substantial amount of heat, which makes these current designs less energy-efficient. Furthermore, a user may need to wait for quite some time for the barrel to be heated due to the nature of thermal conduction.

OBJECT OF THE INVENTION

Therefore, it is an object of the present invention to provide an improved hair curling iron with rotatable barrels, which is more energy-efficient or at least provide the public with a useful choice.

SUMMARY OF THE INVENTION

According to an aspect of present invention, a hair curling iron includes a pair of handles pivotally connected at a conjunction end. The pair of handles is operatable between an open and a closed position for clamping hair. At least one of the handles includes an electrically heatable barrel rotatable about an

axis relative to the one of the handles in operation, and at least one current path connected to the barrel for directly supplying electricity thereto so that the barrel can be heated directly. The current path allows relative movement between the barrel and a power source connected to the handle.

Preferably, the barrel further includes an electrical heater directly built on a surface thereof for heating the barrel directly.

Other aspects and advantages of the invention will become apparent from the following detailed description, taken in conjunction with the accompanying drawings, which description illustrates by way of example the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a side elevational view of a hair curling iron embodiment of the present invention;

Figure 2A is a cross-sectional view taken along section line A-A' of Figure 1, and illustrating the internal structure of the curling iron of Figure 1; and

Figure 2B is cross-sectional view taken along section line B-B' of Figure 2, and illustrating an electricity supply mechanism of the curling iron of Figure 1.

DETAILED DESCRIPTION

Figure 1 illustrates an exemplary hair curling iron 100 embodiment of the present invention. The curling iron 100 generally has an upper holder 101 and a lower holder 103 connected at a conjunction end 105 with various internal structures and electrical connections (not shown in Figure 1) built inside. The holders 101, 103 are pivotable about a hinge 107 located at the

conjunction end 105 so that they can be operated between an open position (not shown) to capture the hair and a closed position (as shown in Figure 1) to clamp and further to curl or straighten the hair captured. Furthermore, a torsion spring 201 (see Figure 2A) mounted to the hinge 107 pushes the holders 101, 103 away from each other towards the open opposition (not shown). Therefore, when the exemplary curling iron 100 is used, the user needs to press the holders 101, 103 towards each other to clamp the hair.

In addition, a conventional cord (not shown) enclosed by a swivel 109 at the conjunction end 105 connects the curling iron 100 to a suitable electric source for power supplies. A switch 111 on the upper handle 101 is used to turn on or off the curling iron 100.

Figure 2A illustrates that in the exemplary embodiment, the upper holder 101 and lower holder 103 have almost exactly the same internal structures and electrical connections. Therefore, the following description only discusses the lower holder 103. However it is understood that the two holders 101, 103 can have different internal structures and/or electrical connections.

In Figure 2A, the lower holder 103 firstly has an elongated cylindrical barrel 203 inside its enclosure 205 defined by a housing 207. It is understood that part of the barrel 203 may be outside the housing 207 for clamping the hair. The barrel 203 has at least a resistor heater 209 directly built on its internal surface (not shown), and the resistor heater 209 can be electrically heated when electricity is supplied thereto as generally understood in the art. In the exemplary embodiment, electricity is directly supplied to the resistor heater 209, which is mounted on the barrel 203 directly, so that the barrel 203 is directly heated when the curling iron 100 is in use for hair styling. Furthermore, in operation, the barrel 203 can rotate about an axis 211 relative to the lower holder 103 for styling the hair.

An adaptor 213, also in an elongated cylindrical shape, is fixedly mounted to the barrel 203 at a first end 215 by, for example, screws 217, so that in operation the adaptor 213 rotates together with the barrel 203 about the axis 211. The adaptor 213 can be made of plastic materials and has a hollow interior 219. Thereby, a pair of wires 221 can be fixedly mounted to an internal surface 223 (also see Figure 2B) of the adaptor 213, and extend from the other end 225 of the barrel to the first end 215, where a pair of electrodes (not shown) is located for electrically connecting the wires 221 to the resistor heater 209 so as to supply electricity thereto.

As shown in Figures 2A and 2B, at the other end 225 of the adaptor 213, the adaptor 213 has a pair of apertures 227 allowing the wires to be fed through and to be further fixedly connected to a pair of metal bear rings 229, which are also fixedly mounted on the adaptor 213 at the other end 225 thereof. Each bear ring 229 has a closed circular configuration for fitting the profile of the adaptor 213 and function as electrodes in the exemplary embodiment to supply electricity to the resistor heater 209 through the wires 221. Since the bear rings 229, the wires 221 and the adaptor 213 are fixedly mounted to each other and since the adaptor 213, the resistor heater 209 and the barrel 203 are also fixedly mounted to each other, in operation, these parts rotate together about the axis 211, and there are no relative movements between any of these parts. This ensures constant and stable electricity supplies from the bear rings 229 to the resistor heater 209 through the wires 221.

The lower handle 103 further has in its enclosure 205 a pair of metal bear plates 231, which are mounted to the housing 207 of the lower handler 103 and which are in constant electrical contact with the pair of bear rings 229 respectively. The bear plates 231 are also in electrical contact with another pair of wires 233, which receives electricity from the conventional cord (not shown) through internal electrical connections (not shown) as generally understood in the art. Thereby, there establishes a complete electrical

connection from the electrical source (not shown) to the resistor heater 209 through the internal electrical connections (not shown), the wires 233, the bear plates 231, the bear rings 229, the wires 221 and the electrodes (not shown).

It is noted the bear plates 231 are mounted to the housing 207 of the lower handler 103. Therefore, in operation, each bear ring 229 rotates relative to its respective bear plate 231. To ensure constant and stable electrical contact between the bear plates 231 and their respective bear rings 229 during the operation, each bear plate 231 is curved to fit the external profile of its respective bear ring 229. Furthermore, the bear plates 231 are biased against their respective bear rings 229 to ensure the constant and stable electrical contact therebetween. Springs can be used for this purpose. In the exemplary embodiment, the bear plates 231 are made of resilient metals, for example, copper, such that the bear plates 231, in a curved shape as shown in Figure 2B, retain resilient forces, which forces press the bear plates 231 against their respective bear rings 229.

It can be understood from the above description that the present invention can reduce lost of heat as compared to the conventional curling iron designs by directly supplying electricity to an electrically heatable barrel so that the barrel is directly heated in operation. Furthermore, the adaptor, bear rings and bear plate structures ensure constant and stable electricity supplies to the barrel directly regardless of the fact that the barrel or the resistor heater is in rotational movements in operation.

Alternatives can be made to the exemplary embodiment. For example, the barrel 203 can be made of metals so that the barrel 203 itself functions as an electrical heater. In that case, electricity is supplied to the barrel directly for direct heating of the barrel.

Besides, the barrel 203 may have an extension with a pair of metal traces built thereon, and the metal traces are in electrical contact with the resistor heater. Furthermore, the traces are in a closed circular configuration and function similarly to the bear rings 229. A pair of metal plates, which can be similar to the bear plates 231 and which receives electricity supplies from the electrical source (not shown), is mounted to the housing 207 and are pressed against the metal traces on the barrel. In this way, electricity is supplied to the resistor heater 209 through the metal plates and the metal traces directly. The fact that the metal traces are built on the barrel directly also ensures constant and stable electricity supplies to the barrel directly regardless of the fact that the barrel or the resistor heater is in rotational movements in operation.

What is claimed is:

1. A hair curling iron, comprising

a pair of handles pivotally connected at a conjunction end, the pair of handles being operatable between an open and a closed position for clamping hair,

wherein at least one of the handles includes

an electrically heatable barrel rotatable about an axis relative to said one of the handles in operation, and

at least one current path connected to the barrel for directly supplying electricity thereto so that the barrel can be heated directly,

and wherein the current path allows relative movement between the barrel and a power source connected to the handle.

2. The curling iron of Claim 1, wherein the current path includes a first portion rotatable with the barrel and a co-operating second portion fixed with the handle.

3. The curling iron of Claim 2, wherein one of the first and second portions is pressed against the other for ensuring constant electrical contact therebetween.

4. The curling iron of Claim 3, wherein at least one of the first and second portions is configured to have a closed profile for ensuring the constant electrical contact therebetween.

5. The curling iron of Claim 1, wherein the barrel includes an electrical heater directly built on a surface thereof for heating the barrel directly.

6. The curling iron of Claim 5, wherein the heater is a resistor heater.

7. The curling iron of claim 1, wherein said one of the handles includes an adaptor fixedly mounted to the barrel at a first end for supporting at least a portion of the current path so that said portion of the current path is not in relative movements to the barrel in operation.

8. The curling iron of Claim 7, wherein said portion of the current path is in the form of a wire, wherein the adaptor has a hollow interior, and wherein the wire is fixedly mounted to an inner surface of the hollow interior so that the wire is not in relative movements to the barrel or the heater in operation.

9. The curling iron of Claim 7, wherein said portion of the current path is in the form of a wire, wherein said one of the handles includes a metal bear ring fixedly mounted to the adaptor at a second end, wherein the bear ring rotates co-axially with the barrel in operation, and wherein the wire is in electrical connection with the bear ring for supply of the electricity.

10. The curling iron of Claim 9, wherein said one of the handles includes a metal bear plate being fixedly mounted to said one of the handles, wherein the bear ring is in rotational movements relative to the bear plate in operation, and wherein the bear plate is in constant electrical contact with the bear ring during the hair styling for supply of the electricity thereto.

11. The curling iron of Claim 10, wherein the bear plate is biased against the bear ring for ensuring the constant electrical contact therebetween.

12. The curling iron of Claim 11, wherein the bear plate is configured to be in a curved shape for fitting a profile of the bear ring so as to ensure the constant electrical contact therebetween.

13. The curling iron of Claim 1, further comprising a cable connected to the conjunction end for supplying electricity to the curling iron from an electric source.

14. The curling iron of Claim 1, further comprising a torsion spring at the conjunction end for biasing the pair of handles away from each other towards the open position.

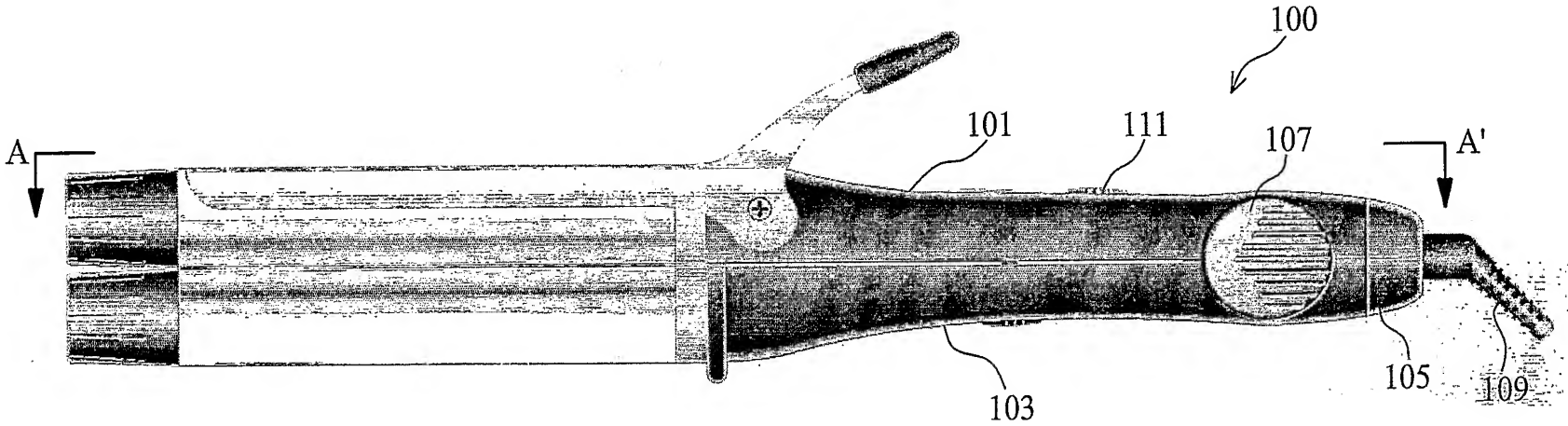
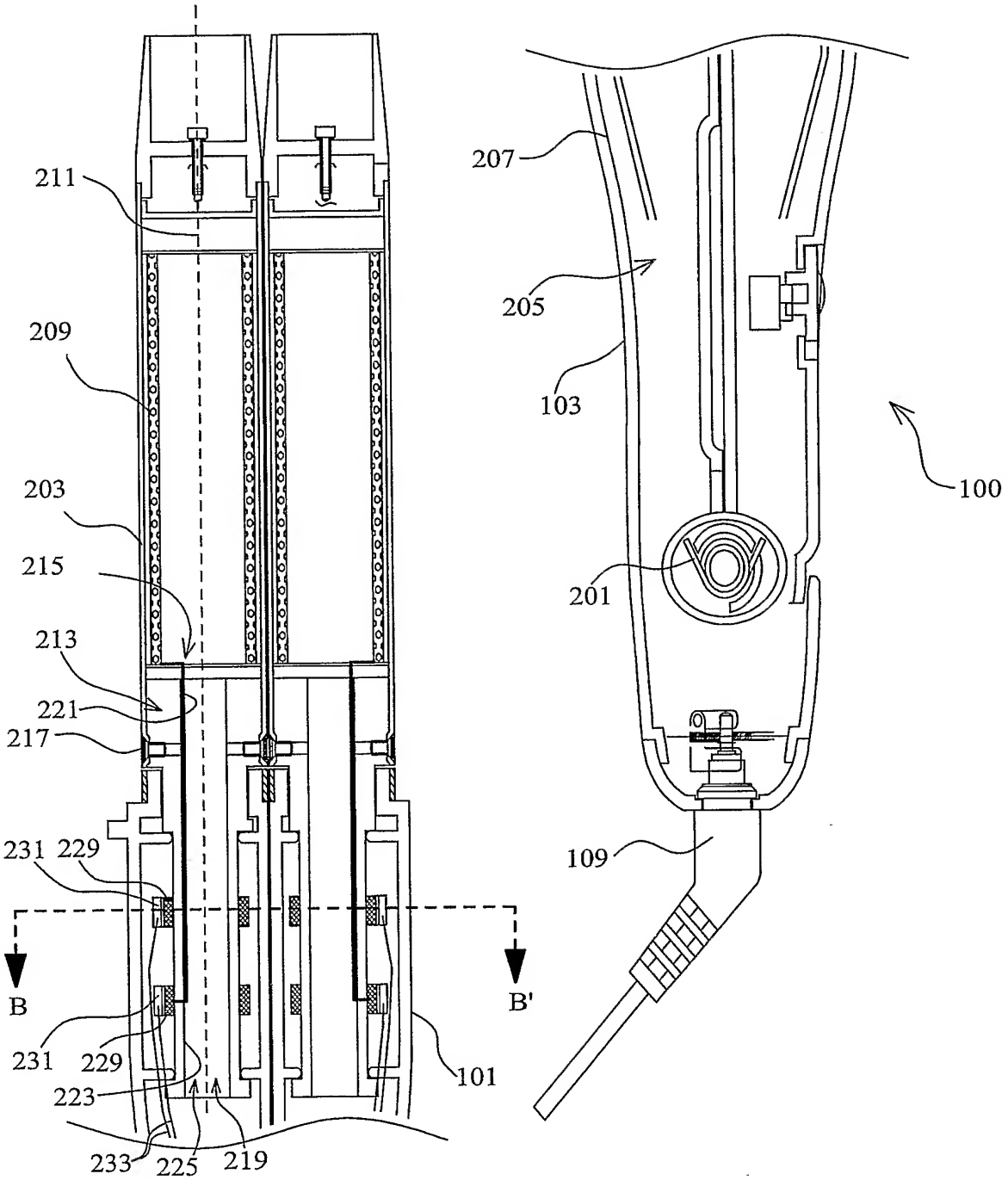


Figure 1


211
209
203
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201
109

Figure 2A

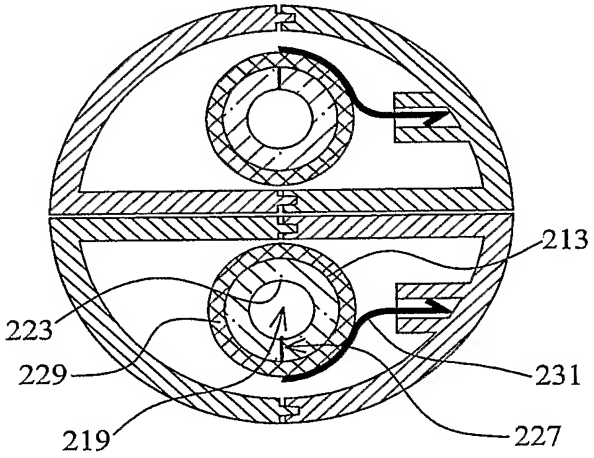

Figure 2B

HAIR CURLING IRON WITH ROTATABLE BARREL

ABSTRACT OF THE DISCLOSURE

A hair curling iron includes a pair of handles pivotally connected at a conjunction end. The pair of handles is operatable between an open and a closed position for clamping hair. At least one of the handles includes an electrically heatable barrel rotatable about an axis relative to the one of the handles in operation, and at least one current path connected to the barrel for directly supplying electricity thereto so that the barrel can be heated directly. The current path allows relative movement between the barrel and a power source connected to the handle.